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**APPLICATION FOR UNITED STATES LETTER PATENT**

**SUBSTITUTE SPECIFICATION**

**TO ALL WHOM IT MAY CONCERN:**

BE IT KNOWN THAT I, Melvin S. Mogil  
of 142 Heddington Avenue, Toronto, Ontario M5N 2K8  
Citizen of Canada, have invented a:

**DIVIDED INSULATED CONTAINER**

of which the following is a specification.

20869403.1

## DIVIDED INSULATED CONTAINER

*I NS B1*  
*8/14/01*  
*B1* [001] This application is a continuation of U.S. Patent Application No. ~~09/323,202~~ <sup>now U.S. Patent No. 6,234,677,</sup> filed June 1, 1999, which in turn is a continuation-in-part of U.S. Patent Application 09 / 199,287 filed November 25, 1998, <sup>now U.S. Patent No. 6,238,091</sup>

5 Field of Invention

*Enter.*  
*8/14/01* [002] This invention relates to the field of soft sided insulated containers. In particular it relates to soft sided insulated containers having a division between zones to permit different environments to be established in different zones.

10 Background of the Invention

*TECHNICAL FIELD*  
[003] In recent times soft sided insulated containers have become popular for carrying either articles that may best be served cool, such as beverages or salads, or warm, such as appetizers, hot dogs, and so on. Such containers are frequently used to carry liquids, whether hot liquids, such as soup containers, coffee or tea, or cold liquids such as beer pop, juices and milk. The containers are typically made in a generally cube like shape, whether of sides of equal length or not, having a base, four upstanding walls, and a top. The top is generally a lid which opens to permit articles to be placed in, or retrieved from, the container.

20 [004] By the nature of their use, it is advantageous for the containers to be water tight. That is, whether to hold melted run-off from ice cubes or to hold spilled liquids, the container must be sufficiently liquid tight that it does not leave a trail of drips, or become moist or sticky to the touch of a person carrying the container.

25 [005] The present inventor has found it disadvantageous to try to seal the container itself. Some types of insulating wall are sewn at their seams. Sewn seams have a tendency to leak at the stitches. Another approach is to fold the insulated blanket from which the container is made, to present an assembly that, through folding, has no seams. This is also disadvantageous,

in the present inventor's view, because the insulated blanket used to form the container walls is relatively thick. The thick material may not tend to make a compact fold. It would be preferable to form an impermeable layer that has a relatively thin wall thickness so that the resulting product does not look bulky and cumbersome.

**[006]** It is also advantageous to be able to clean the inside of the insulated container. Spilt liquids may not always have the most attractive air when allowed to dry, and may cause the inside of the container to become unsightly. It is possible to provide a plastic liner for soft sided insulated containers. A see-through plastic liner can be made of the minimum amount of material by using only a single layer, and forming seams where the edges of the material meet. A common method of forming such a seam is to weld two adjacent edges together by heating. However, an existing liner of this type is known to have had a tendency for the heat welded seams to develop leaks over time. It would be advantageous to reduce or eliminate the number of heat welded seams formed in areas of the liner that may need to be water tight.

**[007]** In general, manufacture of an assembly of this type emphasizes cost reduction. One common source of cost savings is a reduction of the raw material used. However, the present inventor has observed, counter-intuitively, that the overall benefit an increase in raw material use can outweigh the cost saving that would otherwise be achieved. Unexpectedly, the use of a greater amount of material in a folded assembly has been found to be advantageous, and has eliminated the need to have a heat welding station in manufacture.

**[008]** It may also be that, along with objects to be carried in a leak proof chamber at one temperature, another type of good may also be desired, requiring a different environmental condition. For example, it may be inconvenient for persons going to a picnic to carry a different insulated container for each type of food. They may prefer a single container that permits more than one type of food to be carried. That is, it may be preferable to have one zone in the insulated container for a cold, or very cold item, such

as ice cream, and another zone for cool items, such as fruit or drinks. Alternatively, one zone may contain canned drinks in ice, while another zone contains warm or hot foods such as pizza or hamburgers. Temperature is not the only determinant factor. For example, while an ice filled zone may be damp inside, other objects, such as bread or some fruits and vegetables, may need a less moist environment.

**[009]** The proportion of the types of objects to be placed in the container may not always be the same. In those situations, it may be advantageous to be able to alter the relative proportions of the volumes of the zones. It may also be advantageous to provide a stabilizer to segregate items, or to discourage items from shifting during transport.

#### Summary of the Invention

**[010]** In an aspect of the invention there is a soft-sided insulated container, and a removable liner for placement inside the container. The liner is folded from a monolithic sheet of liner stock to define a chamber, capable of holding liquids. The liner is free of heat welded seams.

**[011]** In another feature of that aspect of the invention the liner is made from a water impermeable plastic sheet. In an additional feature of that aspect of the invention the liner is made from a translucent static cling vinyl sheet. In another additional feature of that aspect of the invention the soft sided insulated container has a base, sides and a top. The liner has a base, sides for placement inside and adjacent to the base and sides of the container. The top of the container is moveable to an open position to permit articles to be placed in the chamber.

**[012]** In still another additional feature of that aspect of the invention the chamber has an opening, the opening having a lip, and the liner is mated to the cooler about the lip. In yet another additional feature of that aspect of the invention the opening has four sides, the lip extends about the four sides opening and the liner is mated to the container on the four sides. In a further additional feature of that aspect of the invention the liner has a rectangular base and four sides extending from the base, each of the sides having an

edge adjoining the base and a distal edge distant from the base. The chamber has an opening defined between the distal edges of the sides.

**[013]** In a still further additional feature of that aspect of the invention one of the sides has a lid member extending therefrom, the lid member being moveable to close the opening of the liner. In yet another additional feature of that aspect of the invention the lid member is a flap formed integrally with the liner, the flap having four lid edges, one edge being a folded hinge edge adjoining one of the distal edges of the sides, the remaining three lid edges having a closure for mating with the remaining three distal edges.

**[014]** In another aspect of the invention there is a removable liner for placement inside the container. The liner is formed from a water impermeable plastic sheet. The sheet has a periphery. The liner has a quadrilateral base and four sides extending from the base to define a chamber therebetween capable of holding water. Each of the sides are joined to the base at a base edge. Each of the sides has a pair of lateral edges each meeting the base edge at a corner. Each of the sides has an edge opposed to the base edge and meets each of the lateral edges at a corner. The sheet has corner portions defined between adjacent lateral edges of two of the sides and the periphery and the corner positions are folded to lie against the sides.

**[015]** In a further additional feature of that aspect of the invention the base is a rectangle and two of the sides, joined to the base on opposite sides of the rectangle, are trapezoidal. In a still further additional feature of that aspect of the invention the chamber has the shape of an inverted, truncated rectangular based pyramid. In yet another additional feature of that aspect of the invention the container has an internal face made from a reflective material and the liner is transparent.

**[016]** In another aspect of the invention there is a soft sided insulated container, and a removable liner for placement inside the container. The liner is formed from a water impermeable plastic sheet. The sheet has a periphery. The liner has a rectangular base and four sides extending from the base to form a chamber therebetween, each of the sides being joined to the base at a

base edge. The sheet is folded on a first pair of parallel fold lines to define one pair of the base edges. The sheet is folded on a second pair of fold lines to define the remainder of the edges. The sheet has four corner portions each defined between an end portion of one of the first pair of fold lines, an adjacent end portion of one of the second pair of fold lines and the periphery, and the corner portions are folded to lie against the sides.

**[017]** In an additional feature of that aspect of the invention the sides have an inside face and an outside face and the corner portions are folded to lie against the outside faces. In another additional feature of that aspect of the invention each of the corners is folded to form a triangular flap, and each of the flaps is folded to lie against one of the sides. In still another additional feature of that aspect of the invention one of the triangular flaps is folded to lie against each of the sides of the liner. In still yet another additional feature of that aspect of the invention two of the triangular flaps are folded to lie against one side of the liner. In a further additional feature of that aspect of the invention two of the triangular flaps are folded to lie against one side of the liner, and the other two triangular flaps are folded to lie against another side of the liner.

**[018]** In still a further additional feature of that aspect of the invention each of the sides has a distal edge opposed to its respective base edge. The chamber has a lip defined by the distal edges. The corner portions are fastened to the sides adjacent the lip. In still yet a further additional feature of that aspect of the invention one of the sides has a cover flap formed integrally therewith, and joined thereto at a cover fold, the cover flap mating with the distal edges of the remaining sides of the liner. In an additional feature of that aspect of the invention the container has a reflective inner surface and the liner is transparent.

**[019]** In another aspect of the invention, there is a soft sided, collapsible, insulated container assembly. It has a first collapsible insulated container portion, a second collapsible container portion and a common wall shared between said first and second container portions. The first container

portion has an insulated wall structure and a first chamber defined therewithin. The second container portion having an insulated wall structure and a second chamber defined therewithin. The common wall segregates the first and second chambers from each other. The first chamber is maintainable at a different environmental condition from the environmental condition of the second chamber.

**[020]** In an additional feature of that aspect of the invention, one of the insulated container portions has a liner for containing liquids mounted within its respective chamber. In another additional feature, both of the insulated container portions have liners for containing liquids therein. In a further additional feature, the liner has a lowest extremity and an upper lip, and the liner is seamless to a depth of at least half the height from the lowest extremity to the upper lip. In a further additional feature, the liner is removable from its respective chamber. In a still further additional feature, the container has a partition member mounted within the liner. In an additional feature of that additional feature, the partition member includes a stiffening element. In another additional feature of that additional feature, the partition includes a thermally insulative layer for discouraging heat transfer through the partition. In still another additional feature, the liner has a fitting for engaging the partition, and the partition is movable to a plurality of positions in engagement with the fitting. In still yet another additional feature, the respective chamber has a plan form section, the partition is moveable to lie in a horizontal orientation relative to the chamber, and, in that horizontal position, the partition has a shape to match the plan form section.

**[021]** In a further aspect of the invention, there is a soft sided collapsible container assembly. It includes a collapsible insulated wall structure having a chamber defined therewithin. A removable liner is provided for discouraging leakage of liquid from within the chamber. The liner has a lowest extremity and a lip. The liner is seamless to a height at least half way from the lowest extremity to the lip. There is a segregation member for dividing the chamber into at least two sub-compartments.

**[022]** In an additional feature of that aspect of the invention, the segregation member is movable between a plurality of positions within the liner. In another additional feature, the segregation member is movable to at least one substantially vertical position for dividing the chamber into sub-compartments lying horizontally adjacent to the segregation member. In a further additional feature, the segregation member is movable to at least one substantially horizontal position for dividing the chamber into sub-compartments lying above and below the segregation member. In another additional feature, the partition member includes a stiffening element. I still another additional feature, the partition member includes a thermally insulative layer for discouraging heat transfer through the partition member.

#### Brief Description of the Drawings

**[023]** These aspects and other features of the invention can be understood with the aid of the following illustrations of a number of exemplary, and non-limiting, embodiments of the principles of the invention in which:

**[024]** Figure 1 is a three quarter view, general arrangement drawing of an insulated container and liner assembly according to the present invention;

**[025]** Figure 2 is a view of the assembly of Figure 1 taken on an opposite angle;

**[026]** Figure 3 is a developed view of a liner for use in the assembly of Figure 1;

**[027]** Figure 4 is a developed view of an alternative liner for an assembly analogous to the assembly of Figure 1 in which two sides are tapered;

**[028]** Figure 5 is a developed view of an alternative liner for an assembly analogous to the assembly of Figure 1 in which four sides are tapered;

**[029]** Figure 6 is a developed view of an alternative liner for an assembly analogous to the assembly of Figure 1 in which the forward side of the assembly is wider than the rearward side;

**[030]** Figure 7 is a front view of the assembly of Figure 1 in a collapsed position;



- [031]** Figure 8 is a rear view of the assembly of Figure 1 in a collapsed position;
- [032]** Figure 9 is a side view of the assembly of Figure 1 in a collapsed position;
- 5 **[033]** Figure 10 shows the construction of a wall section of the assembly of Figure 1;
- [034]** Figure 11 is a view of an alternative liner for the assembly of Figure 1;
- [035]** Figure 12 is an isometric view of an alternative insulated container for an assembly similar to that of Figure 1, but being of greater depth;
- 10 **[036]** Figure 13 shows a liner for the insulated container of Figure 12 with an internal divider in a vertical orientation;
- [037]** Figure 14 shows a liner for the insulated container of Figure 12 with an internal divider in a horizontal orientation;
- [038]** Figure 15 shows an isometric view of a further alternative assembly to the assembly of Figure 1;
- 15 **[040]** Figure 16 shows an isometric view of the assembly of Figure 15 taken from the diagonally opposite corner;
- [041]** Figure 17 shows the assembly of Figure 15 with a lid to one chamber open;
- 20 **[042]** Figure 18 shows the assembly of Figure 15 with its opposite chamber open;
- [043]** Figure 19 shows the assembly of Figure 15 with its liners removed;
- [044]** Figure 20 shows the assembly of Figure 15 in a collapsed position;
- [045]** Figure 21 shows the assembly of Figure 15 in the collapsed position taken from the diagonally opposite corner to Figure 20;
- 25 **[046]** Figure 22 shows a left-hand side elevation of the assembly of Figure 15;
- [047]** Figure 23 shows a right-hand side elevation of the assembly of Figure 15;
- 30 **[048]** Figure 24 shows a near end view of the assembly of Figure 15;
- [049]** Figure 25 shows a far end view of the assembly of Figure 15;
- [050]** Figure 26 shows a plan view of the assembly of Figure 15;
- [051]** Figure 27 shows a right-hand side elevation of the assembly of Figure 20;

**[052]** Figure **28** shows a left-hand side elevation of the assembly of Figure **20**;

**[053]** Figure **29** shows a near end view of the assembly of Figure **20**;

**[054]** Figure **30** shows a far end view of the assembly of Figure **20**; and

5 **[055]** Figure **31** shows a plan view of the assembly of Figure **20**.

Detailed Description of a Best Mode for Practicing the Invention

10 **[056]** The description which follows, and the embodiments described therein, are provided by way of illustration of an example of a particular embodiment, or examples of particular embodiments, of the principles of the present invention. These examples are provided for the purposes of explanation, and not of limitation, of those principles and of the invention. In the description which follows, like parts are marked throughout the specification and the drawings with the same respective reference numerals.

15 The drawings are not necessarily to scale and in some instances proportions may have been exaggerated in order more clearly to depict certain features of the invention.

20 **[057]** Referring to the general arrangement illustrations of Figures **1** and **2**, an example of a preferred embodiment of an insulated container and liner assembly according to the principles of the present invention is indicated generally as **20**. It has two major elements, those being an outer casing in the nature of a soft-sided insulated container **22**, and a removable, impermeable liner **24** for placement inside container **22**. An optional moveable bulkhead, or

25 baffle, in the nature of a partition wall **25** seats within liner **24** for dividing the interior space into two sub-compartments **27, 29**.

30 **[058]** Looking at these major elements in detail, it can be seen that container **22** has a bottom **26**, a front panel **28**, a rear panel **30**, and a pair of left and right hand side panels **32** and **34**. In this preferred embodiment the choice of front and rear, left and right, orientations is arbitrary. Each of front panel **28**, rear panel **30**, and left and right hand side panels **32** and **34** is joined at sewn seams to bottom **26** at bottom vertices **36, 37, 38, or 39**

respectively. Similarly, front panel **28** and side panels **32** and **34** have top edges **40**, **41** and **42**, distant from their base edges. Rear panel **30** is joined by a folded hinge **44** at its top edge to a top panel in the nature of a lid **46**. Lid **46** has a closure member in the nature of a zipper **48** extending in a U-shape around the three free edge portions of its periphery to mate with the other portions of zipper **48** positioned about the three top edges **40**, **41** and **42** of panels **28**, **32** and **34**. Lid **46** is moveable between a closed position, in which zipper **48** may be zipped closed, and an open position in which lid **46** is folded back to permit entry and exit of objects to and from an internal cavity **50** defined between bottom **26** and panels **28**, **30**, **32** and **34**. A generally rectangular insulated auxiliary pouch **52** is mounted to the front face of front panel **28**.

**[059]** In the preferred embodiment, lid **46** has an extent substantially equal to that of bottom panel **26**. This need not be the case. Lid **26** could be a small opening set in a larger top panel, or could be an opening of half, or some other portion of the panel. The opening need not extend fully along three sides of lid **26**, but could extend along part of one or two sides as may be found suitable in a particular use.

**[060]** Top edges **40**, **41**, and **42** form the rim **54** of cavity **50**. On the inside of rim **54** is a liner securing means, or liner attachment mounting, in the nature of a zipper **56**, which, in the embodiment illustrated, includes portions **57**, **58**, and **59** mounted respectively to panels **28**, **32**, and **34** near their upper margins, and a hook and eye fabric fastener strip **60** mounted to panel **30**. Although this arrangement is preferred, in an alternative embodiment all of strip portions **57**, **58**, **59** and **60** (or some other combination of them) could be hook-and-eye fabric fasteners. Other types of mounting could be used, in addition to zippers, such as interlocking seal strips, snaps, clips, grommets or other means.

**[061]** Container **22**, with liner **24** installed, can be folded to a collapsed position, as shown in Figures **7**, **8** and **9**. In this collapsed, or storage position, side panels **32** and **34** fold inward, and bottom **26** folds upward. This permits front panel **28** to move toward rear panel **30**. Lid **46** is then drawn

forward and downward in front of front panel **28** and auxiliary pouch **52**. Lid **46** has, on its inner face, spaced inwardly from zipper **48**, a retainer in the nature of another hook and eye fastener strip **62** that engages a mating hook and eye fastener strip **64** located on a lower portion of the front face of auxiliary pouch **52**. In addition, left and right hand side retainers **66** and **68** mounted to the left and right hand edges of auxiliary pouch **52** of front panel **28** are drawn around to fasten to fastening strips **70** and **72** located on the outer, rearward face of rear panel **30**. (When container **22** is in its open position, side retainers **66** and **68** engage storage strips **74** and **76** located on side panels **32** and **34** respectively).

**[062]** Other features of container **22** are visible in Figures **1** and **2**. Front and rear carrying handles **78** and **80** with reinforced bails are attached to both front panel **28** and rear panel **30** to permit two people to carry assembly **20** between them. In the preferred embodiment assembly **20** has a maximum capacity of 24 quarts. Smaller embodiments, include a twelve quart container. A single shoulder strap **79** is attached to side panels **32** and **34**. An elasticized retaining matrix **82** permits other materials, such as cups, plates, serving utensils or other objects to be carried on top of assembly **20**. Above strip **64**, auxiliary pouch **52** has a see-through mesh pocket **84**, such as may be convenient for carrying knives, forks, spoons or other objects.

**[063]** Figure **10** shows a cross section of front panel **28** with liner **24** in place. A scab section of panel **34** is also shown to reveal its layers of construction. With the exception of auxiliary pouch **52**, this section is typical not only of front panel **28** but also, generally, of rear panel **30**, side panels **32** and **34**, bottom **26** and lid **46**. The outer facing layer of front panel **28** is a canvas covering layer **88** for resisting abrasion. It overlays a closed cell foam insulation layer **90**. The inner face of insulation layer **90** is covered by flexible plasticised metallic foil sheeting **92** that is shiny and reflective. The material is sold under the name Therma-Flect (T.M.). Liner **24** lies inside sheeting **92**, and is pressed against it by the objects it contains. The inside of pouch **52** is lined with white vinyl sheeting, **93** on its forward and bottom sides.

**[064]** Liner **24** is shown in Figures **1**, **2** and **3**. It is made from a membrane, or web, in the nature of a sheet **100** of flexible, transparent plastic stock, in particular, static cling vinyl. The shiny, reflective surface of sheeting **92** is visible through liner **24** in use. Liner **24** has a base **102** and four sides, front, rear, left hand and right hand respectively, **104**, **106**, **108**, and **110** extending upwardly from base **102**. Each of sides **104**, **106**, **108** and **110** is joined to base **102** at a base edge, **112**, **114**, **116** or **118**, as indicated, and each has an opposite, distal edge **120**, **122**, **124** or **126** distant from its respective base edge. The sides meet at respective upstanding corners **128**, **130**, **132** and **134**. A chamber **136** is defined between base **102** and sides **104**, **106**, **108** and **110**. Chamber **136** has an opening **138** defined by the peripheral lip **140** formed collectively by the distal edges **120**, **122**, **124** and **126** of sides **104**, **106**, **108** and **110**. Immediately below lip **140** liner support fasteners, in the nature of hook and eye strips, are mounted to sheet **100**. This mounting may be by heat welding or by use of a bonding agent or adhesive. In the preferred embodiment lip **140** is folded over to form a hem, and fasteners **141**, **144**, **143** are of the nature of a continuous zipper around three sides of lip **140**, and a fastener **142** in the nature of a fabric hook-and-eye strip are sewn in place with stitching **145** that is at a height relative to base **102** that is expected to be well above the liquid level in liner **24**.

**[065]** In an alternate embodiment, fasteners **141**, **142**, and **143** are all fabric hook and eye fasteners each mounted on one side of lip **140**, and which mate with corresponding hook-and-eye fastener strips mounted to container **22**. These fastener strips are commonly sold under the name Velcro (T.M.). Optional partition **25** is variably positionable. About the upper portion of its periphery it has a strip engaging material **146** that catches on mating strips **147** and **148** located on the inner face of liner **24**. These strips can be hook and eye fastener strips. The range of the strips permits the division of sub compartments **27** and **29** of chamber **136** into equal, half-and half portions, or into some other portions, such as  $1/4$  to  $3/4$ ,  $1/3$  to  $2/3$ ,  $2/5$  to  $3/5$  and so forth as may be found desirable given the objects to be contained in chamber **136**.

**[066]** In Figure 3 sheet **100** is shown in developed view, as it would be before being folded to form liner **24**. A first pair of parallel fold lines **150** and **152** extend across sheet **100**, and a second pair of parallel fold lines **154** and **156**, perpendicular to lines **150** and **152** extend along sheet **100**, thus dividing it into nine portions within the rectangular periphery, **158**, of sheet **100**. It will also be noted that each of lines **150**, **152**, **154** and **156** has two intersections, and is thus divided into a central sector between the parallel lines it intersects, and a pair of end sectors between each of the parallel lines it intersects and the line's termination at periphery **158**.

**[067]** The central portion of sheet **100**, bounded by the central sector of each of lines **150**, **152**, **154** and **156**, defines base **102**, each of those sectors defining one of base edges **112**, **114**, **116** and **118**. Front side **104** is defined between the central sector **160** of line **150**, two parallel forward end sectors **162** and **164** of lines **154** and **156**, and a mid-edge sector **166** of periphery **158**. Rear side **106** is defined by the central sector **168** of line **152**, two parallel rearward end sectors **170** and **172** of lines **154** and **156**, and a mid edge sector **174** of periphery **158**. Left hand side **108** is defined by central sector **176** of line **154**, two left end sectors **178** and **180** of lines **150** and **152**, and a mid-edge sector **182** of periphery **158**. Right hand side **110** is defined by central sector **184** of line **156**, two right end sectors **186** and **188** of lines **150** and **152**, and a mid-edge sector **190** of periphery **158**.

**[068]** The remaining four portions of sheet **100** are corner portions **192**, **194**, **196** and **198** defined by a pair of adjacent end sectors of a pair of perpendicular lines, and a corner sector of periphery **158**, indicated respectively as **202**, **204**, **206** and **208**. Corner portions **192**, **194**, **196** and **198** are bisected by diagonal bisectors **212**, **214**, **216** and **218** which extend from the intersection of the respective perpendicular lines to periphery **158**.

**[069]** Having thus defined the geometry of sheet **100**, liner **24** is formed by folding sides **104**, **106**, **108** and **110** upwardly such that sectors **162** and **178**, **164** and **186**, **170** and **180**, and **172** and **188** lie adjacent to each other to form corners **128**, **130**, **132** and **134** respectively. This folding

necessitates folding of corner portions **192**, **194**, **196** and **198**, and this is done along their respective diagonal bisectors.

**[070]** When folded along bisectors **212**, **214**, **216** and **218** corner portions **192**, **194**, **196** and **198** form triangular flaps **220**, **222**, **224** and **226**, as shown in Figures 1 and 2. In the preferred embodiment flaps **220** and **222** are folded to lie against the outside face of front side **104**, the corner of flap **220** lying most distant from corner **128** overlapping the corner of flap **222** lying most distant from corner **130**. Similarly flaps **224** and **226** are folded to lie against the outside face of rear side **106** the most distant corner of flap **224** overlapping the most distant corner of flap **226**. One edge of each flap lies roughly flush with lip **140**, which is folded over and the entire periphery of opening **138** of chamber **136** sewn as a hem **228** having a double row of stitches. In this way liner **24** is formed from sheet **100** such that it is not only free of welded seams, but free of any seams below hem **228** of lip **140**.

**[071]** In the preferred embodiment the folding process is purely mechanical, and can be performed relatively quickly, in contradistinction to heat welding or adhesive bonding processes which require a time interval for heating and cooling or for adhesive curing. Inasmuch as the preferred embodiment uses a relatively thick static cling vinyl, sheet **100** can be folded over a cube form of the desired dimensions, and held in place by its own clinging properties in preparation for the sewing of hem **228**. The overlap of the tips of flaps **220** and **222**, and flaps **224** and **226**, and subsequent sewing makes it doubly improbable that liner **24** will unfold.

**[072]** Liner **24** is formed from a single integral sheet, and, absent punctures of that sheet, is not intended to leak below the level of the sewn seam at lip **140**. The body of base **102** and sides **104**, **106**, **108** and **110** is seamless, being free of heat welds or other joints. In general use the liquid level in chamber **136** is not expected to be greater than one half of the height of the sides, and still less commonly to be more than three quarters of the height. There are no seams below either of these levels, heat welded or otherwise.

**[073]** Liner **24** is also thin enough that it can be folded inside container **22** when container **22** is compressed to its collapsed position as illustrated in Figures **7**, **8**, and **9**. Liner **24** need not be transparent, but could be translucent or opaque. A transparent liner is preferred since it permits the reflection of sheeting **92** to be seen.

**[074]** In an optional embodiment, a liner **224** can have its own closure, or lid, **230**, to provide a double closure with lid **46** of container **22** in Figure **11**. As shown in Figure **11**, optional lid **230** extends on a folding plastic hinge **232** that is an integral part of sheet **234** from rear side **236** of sheet **234**, and mates at front, left hand and right hand side edges **238**, **240** and **242** along a U-shaped closure interface such as may be held closed by a closure member in the nature of a seal, a zipper, a hook and eye fabric fastener, or a similar device. It is not necessary that the opening of the container, or the liner, form a parallel plane to the respective base or bottom sides. The opening could be in a skewed plane, or could be something other than a plane.

**[075]** In alternative embodiments, one of each of corner flaps **220**, **222**, **224** and **226** can be folded against each of sides **104**, **106**, **108** and **110**, or a pair (**220**, **224**) can be folded against left hand side **108** and another pair (**222**, **226**) against right hand side **110**, rather than against front and rear sides **104** and **106** as illustrated in Figure **11**. It is not necessary that the corner portions have one edge lying flush with lip **146**. However, if the corner portions are cut down, the height at which a liquid tight barrier is provided may not necessarily be as high as shown in the preferred embodiment of Figure **1**. It is also not necessary that corner portions **192**, **194**, **196**, and **198** be folded against the outside faces of the sides, but could be folded to lie along the inside faces. It would also be possible to fold each flap to lie partially against one side and partially against another side by using more than one fold line and by cutting the periphery of the corner portions differently. There is simplicity in using a single fold and to fold the flaps against the outside of one side of the liner, as shown in the preferred embodiment of Figure **1**.

**[076]** As shown in the developed views of the alternate embodiments of Figures **4**, **5**, and **6**, the liner need not be a cube or cuboid, but could be a



tapered, trapezoidal, or truncated pyramidal shape. In the embodiment of Figure 4 a developed sheet **250** has fold lines for forming a liner having a pair of opposed trapezoidal sides **254** and **256** which rise at right angles from a base **258**, and a pair of opposed rectangular sides that are folded upward at an angle corresponding to the rake angle  $\psi$  of trapezoidal sides **254** and **256**. It can be seen that there is one pair of parallel fold lines **260** and **262**, each line having a central sector **264**, **266** and a pair of left and right end sectors **268**, **270** or **272**, **274**. There is also a pair of fold line sectors **276** and **278** which define the remaining two sides of base **258** (perpendicular to sectors **264** and **266**). The intersections of sectors **276**, **264**, **278**, and **266** define the corners of base **258**. Extending away from those corners to periphery **280** are left and right hand canted trapezoidal side sectors **282**, **284**, **286**, and **288** to define the remaining vertices of trapezoidal sides **254** and **256**. At the angular bisector of the included angle between adjacent pairs of rectangular side lateral sectors and trapezoidal side sectors, as, for example between sectors **268** and **282**, are corner portion fold lines **290**, **292**, **294**, and **296**. Corner portions **298**, **300**, **302** and **304**, each defined between one trapezoidal side end sector, one rectangular side end sector and periphery **280**, have been trimmed along periphery **280** to lie flush with the resulting lip. When sheet **250** is folded in a manner analogous to the folding of sheet **100**, a cradle shaped liner will result, for mating use with a similarly cradle shaped container analogous to container **22**.

[077] In the embodiment of Figure 5 a developed sheet **310** has fold lines for forming a liner **312** having a first pair of opposed trapezoidal sides **314** and **316** which rise at a non-perpendicular angle  $\phi$  from a base **318**, and a second pair of opposed trapezoidal sides **320**, **322** that are folded upward at a rake angle  $\beta$  of the first pair of trapezoidal sides **314** and **316**. It can be seen that there is one pair of fold line sectors **324**, **326** and a perpendicular pair of fold line sectors **336** and **338** which define the remaining two sides of base **318**. The intersections of sectors **336**, **324**, **338**, and **326** define the corners of base **318**. Extending away from those corners to periphery **340** are left and right hand trapezoidal side lateral sectors **328**, **330**, **332** and **334**. Similarly, left and right hand canted trapezoidal side sectors **342**, **344**, **346**,

and **348** extend from those intersections toward periphery **340** to define the remaining vertices of the trapezoidal sides. At the angular bisector of the included angle between adjacent pairs of rectangular side lateral sectors and trapezoidal side sectors, as, for example between sectors **328** and **342**, are corner portion fold lines **350**, **352**, **354**, and **356** of corner portions **358**, **360**, **362** and **364**.

**[078]** Sectors **332**, **334**, **328**, **330**, **342**, **344**, **346** and **348** all have the same true length, indicated as  $l$ . The distance that sectors **332**, **334**, **336** and **338** are splayed outward from square is indicated as  $\epsilon$ . The distance that sections **342**, **344**, **346** and **348** are splayed outward from square is indicated as  $\delta$ . Angle  $\phi$  satisfies the condition that  $\sin \phi = [\epsilon / (l^2 - \delta^2)^{1/2}]$ . Similarly angle  $\beta$  satisfies the condition that  $\sin \beta = [\delta / (l^2 - \epsilon^2)^{1/2}]$ .

**[079]** When folded in a manner analogous to the folding of sheet **100**, sheet **310** will form a truncated, inverted rectangular shaped pyramid. It should be noted that the pairs of opposed slanted pyramid sides need not rise at the same angle, but could be at different angles. In the most general case, each side could rise at a different angle, and to a different height. The upper edges of the sides need not be level, but could have a slant, or, alternatively, need not be linear but could be curved as may suit the desired geometry. However, it is expected that the sides will, most often, have straight and level edges.

**[080]** In the embodiment of Figure 6, a developed sheet **360** has fold lines for forming a liner **362** having a trapezoidal base **364** such as might be desired in a knapsack having a large rearward face for placement against a person's back, and a narrower outer or forward face. A pair of parallel lines of unequal length, being a short front fold line **366** and a longer rear fold line **368**, define the parallel sides of the trapezoidal base **364**. A pair of left and right hand side fold lines **370** and **372** extend between lines **366** and **368** at angles to define the splayed sides of trapezoidal base **364**. Front side **374**, rear side **376**, left side **378** and right side **380** are all hinged along respective fold lines **366**, **368**, **370** and **372** to base **364**. Corner portions **382**, **384**, **386** and **388** are defined between the periphery **390** and respective pairs of side

sectors **392** and **394**, **396** and **398**, **400** and **402**, and **404** and **406**. Each of portions **382**, **384**, **386** and **388** has a fold line **408**, **410**, **412** or **414** on which the respective corner portion is folded, those portions being trimmed along their peripheral edges to lie flush with the peripheral edges of the respective sides against which they are folded, similar to the manner described above in connection with the preferred embodiment.

**[081]** Referring to the general arrangement illustrations of Figures **12** and **13**, an alternative embodiment of an insulated container and liner assembly is indicated generally as **420**. It has two major elements, those being an outer casing in the nature of a soft-sided insulated container **422**, and a removable, impermeable liner **424** for placement inside container **422**. An optional moveable bulkhead, or baffle, in the nature of an insulated, partition wall **425** seats within liner **424** for dividing the interior space into two chambers, or sub-compartments **427**, and **429**.

**[082]** Looking at these major elements in detail, it can be seen that container **422** is of generally similar construction to container **22**. Container **422** has a bottom **426**, a front panel **428**, a rear panel **430**, and a pair of left and right hand side panels **432** and **434**. Each of front panel **428**, rear panel **430**, and left and right hand side panels **432** and **434** is joined at sewn seams to bottom **426** at bottom vertices. Rear panel **430** is joined by a folded hinge **436** at its top edge to a top panel in the nature of a lid **438**. Lid **438** has a closure member in the nature of a zipper **440** extending in a U-shape around the three free edge portions of its periphery to mate with the other portions of zipper **440** positioned about the top edges of panels **428**, **432** and **434**. Lid **438** is moveable between a closed position, in which zipper **440** may be zipped closed, and an open position in which lid **438** is folded back to permit entry and exit of objects to and from an internal cavity **442** defined between bottom **426** and panels **428**, **430**, **432** and **434**. A generally rectangular insulated auxiliary pouch **444** is mounted to the front face of front panel **428**.

**[083]** On the inside of rim **446** is a liner securing means, or liner attachment mounting, in the nature of a zipper **448**, which includes portions

mounted respectively to panels **428**, **432**, and **434** near their upper margins, and a hook and eye fabric fastener strip **449** mounted to panel **430**. In an alternative embodiment the strip portions (or some other combination of them) could be hook-and-eye fabric fasteners. Other types of mounting could be used, in addition to zippers, such as interlocking seal strips, snaps, clips, grommets or other means.

**[084]** Container **422**, with liner **424** installed, can be folded to a collapsed position in a similar manner to that of container **22**, as shown in Figures **7**, **8** and **9** and described above. Container **422** also has the other feature of container **22** noted above such as shoulder straps, carrying handles, an elasticized retaining matrix, and a see-through mesh pocket. Aside from greater depth, container **422** has the same construction as container **22** described above with reference to Figure **10**.

**[085]** Liner **424** is shown in Figures **13** and **14**. It is made from a membrane, or web, in the nature of a sheet **450** of flexible, transparent plastic stock, in particular, static cling vinyl. Liner **424** has a base **462** and four sides, front, rear, left hand and right hand respectively, **454**, **456**, **458**, and **460** extending upwardly from base **462**. Each of sides **454**, **456**, **458** and **460** is joined to base **462** at a base edge, and each has an opposite, distal edge distant from its respective base edge. The sides meet at respective upstanding corners **478**, **480**, **482** and **484**. A chamber **486** is defined between base **462** and sides **454**, **456**, **458** and **460**. Chamber **486** has an opening **488** defined by the peripheral lip **490** formed collectively by the distal edges **470**, **472**, **474** and **476** of sides **454**, **456**, **458** and **460**. Immediately below lip **490** liner support fasteners, in the nature of hook and eye strips, are mounted to sheet **450**. This mounting may be by heat welding or by use of a bonding agent or adhesive. Lip **490** is folded over to form a hem, and a continuous zipper around three sides of lip **490**, and a fastener **492** in the nature of a fabric hook-and-eye strip are sewn in place with stitching **494** that is at a height relative to base **462** that is expected to be well above the liquid level in liner **424**. It will be appreciated that liner **424** could, alternatively, and with appropriate geometric adjustments, be formed in any of the shapes

described above in the context of Figures 3, 4, 5 and 6. It will also be appreciated that liner 424 could be formed in a shape having a lid, as illustrated in Figure 11.

5       **[086]**       In Figure 13, partition 425 is shown in a vertical orientation, and, just as in the manner of partition 25, partition 425 is variably positionable. About the upper portion of its periphery it has a strip engaging material 496 that catches on mating strips 497 and 498 located on the inner face of liner 424. These strips can be hook and eye fastener strips. The range of the  
10       strips permits the division of sub-compartments 427 and 429 of chamber 486 into equal, half-and half zones or portions, or into some other proportion of zones or portions, such as 1/4 to 3/4, 1/3 to 2/3, 2/5 to 3/5 and so forth as may be found desirable given the objects to be contained in chamber 486.

15       **[087]**       In Figure 14, liner 424 is shown with partition 425 in a horizontal arrangement. Container 422 and liner 424 have been illustrated as having the same, or roughly the same, width and height, so that partition 425 can be used, as in Figure 13, to divide chamber 486 into two zones separated by a vertical bulkhead or divider. Alternatively partition 425 can be used to divided  
20       chamber 486 into two zones separated by a horizontal, or roughly horizontal, floor or divider, or partition. In the latter case, the materials below the partition, such as cans, bottles or boxes, (not shown) support the partition, and the materials above rest upon the partition. Partition 425 is a relatively stiff panel, having a stiffener element that is insulated on both planar faces, and encased in a substantially water impermeable, and washable, external  
25       skin. The insulation material is a closed cell foam, generally similar to that used in the body of container 422. The plan form of partition 425 is generally rectangular, with rounded corners, to fit within the projected opening shape of liner 424 in close fitting relationship either in the vertical orientation of Figure  
30       13 or the horizontal configuration of Figure 14.

**[088]**       While partition 425 is water impermeable, its fit within liner 424 is not water-tight. It is, however, a sufficient fit to tend to permit a measure of isolation, or environmental segregation, between the zones on either side of

the partition from each other. When partition **425** is oriented to lie generally horizontally it may tend to permit cool materials to be carried in that portion of chamber **486** below partition **425**, and warm or hot materials above. It may also tend to permit wet, or moist materials to be carried below partition **425** and relatively dry materials, such as bread or buns to be carried above. A vertical orientation of partition **425** may also tend to permit segregation into different zones of hot and cool for dry materials. In either orientation, the stiffness of partition **425** may tend to serve to provide softer materials, such as bread or fruit, with some protection from harder materials, such as bottles or cans that might otherwise crush them during the jostling of transportation.

**[089]** Although only one partition **425** is illustrated, it would be possible to provide more than one such partition to permit division of the internal volume of the container into 3, 4 or more sub-compartments. It is also possible to provide a divider, or partition that, in generally horizontal orientation, only covers, or occludes, a portion of the chamber, in the manner of a partial shelf, or set of shelves. Such a partial divider may not tend to provide as effective a thermal barrier as a large partition that more closely matches the plan form of vertical section of the container. Notably, each of partitions **25** and **425**, as illustrated and described, is mounted within its respective liner, **24** or **424**.

**[090]** Figures **15** through **31** show an alternative type of soft-sided, insulated wall, collapsible container assembly, indicated generally as **500**. In the foreground of Figure **15** it has a first container portion, indicated generally as **502** and a second container portion, indicated generally as **504**. As illustrated first portion **502** is the same width and height as second portion **504**, but is of lesser length. In the embodiment illustrated this difference is in the ratio of approximately 2:1, but could be greater or lesser, typically in the range of 1:1 to 5:1.

**[091]** The basic lid, bottom, and sidewall construction of each of the first and second portions is the same as described above in the context of containers **22** and **422**. Each has the general form of six-sided softwalled

box, with portions **502** and **504** being joined at a common insulated wall **506** that is silvered on both sides. As with containers **22** and **422**, a pair of left and right hand carrying handles **508** and **510** are provided, being mounted to main sidewall portions **512** and **514** of second portion **504**. The front and rear faces each have a ring mounting **515**, **516** to which a carrying strap, such as a shoulder strap, (not shown) can be attached. A top ring fitting **518** is mounted to the lid portion **520** of second portion **504**, and is rooted in the joint between first and second portions **502** and **504**.

**[092]** End face **522** of first portion **502** has a peripheral strap **524**, and a see through mesh pocket **526** in the manner of pocket **84** described above. A hook and eye fastener strip **528** is mounted laterally to pocket **526** adjacent to, and below its lip to provide an anchoring location for a mating fastener strap **530** mounted to the inner lip **531** of the inside face of lid portion **532** of first portion **502**. First portion **502** also has a pair of storage fastening straps, in the nature of left and right hand side retainers **534** and **536** rooted in the main junction, that extend to engage either fastening strips **538** and **540** (similar to items **70** and **72**, above) when in the collapsed position described above, or storage strips **542** and **544** ( similar to items **74** and **76**) when the cooler is in its expanded position.

**[093]** Second portion **504** also has a peripheral strap, **550**, side retainers **552** and **554**, and collapsed and open position hook and eye fastener patches **556**, **558**, **560** and **562**. End face **564** of second portion **504** does not have a lateral strip similar to strip **528**. Instead, the outer end tang **566** of each of retainers **552** and **554** has a hook and eye fabric fastener patch on both inside and outside faces. In that way, when second portion **504** is collapsed, retainers **552** and **554** engage patches **560** and **562**. Then lid portion **520** is drawn downwardly over end face **564** and a fastening strip **570** mounted inside the lip of lid portion **520** engages the outside face patches of tangs **566**, and is retained in place by them.

**[094]** Each of portions **502** and **504** is provided with a liner, **572** and **576** respectively, either or both of which can be provided with an insulated partition analogous to partition **425**, as described above in the context of

Figures 12, 13 and 14. It is not necessary that both portions 502 and 504 have a water-tight liner, since it may be that only one chamber is required for containing a wet object or objects. The double-cooler arrangement illustrated provides a fixed, water-tight barrier between one environment, that prevailing in chamber 580 of first portion 502, and another environment, that prevailing in chamber 582 of second portion 504. In the event that partitions are provided, those chamber can themselves be further divided. Although the relative sizes of chambers 580 and 582 are fixed, wall 506 provides a more substantial thermal barrier than the moveable partitions. Further, lid portions 520 and 532 provide separate access to the respective compartments, that is, chambers 580 and 582. Assembly 500, like assemblies 20 and 420 provides the combination of a liquid containment barrier for discouraging unwanted escape of liquid, and an environment segregation barrier by which to separate cool and cold, cold and hot, wet and dry, or soft and hard. However, in the former two cases, the physical segregation barrier, that is, partition 25 or 425, is mounted within the moisture containment barrier, that is either liner 28 or 428. In the latter instance whether or not there is also a moveable partition provided, the moisture containment barrier lies to one side of the dividing wall, in the nature of common wall 506.

[095] A preferred embodiment has been described in detail and a number of alternatives have been considered. As changes in or additions to the above described embodiments may be made without departing from the nature, spirit or scope of the invention, the invention is not to be limited by or to those details, but only by the appended claims.